

9, 812 / pt. 2
TECHNICAL SERIES, No. 27, PART II.

U. S. DEPARTMENT OF AGRICULTURE,
BUREAU OF ENTOMOLOGY.

L. O. HOWARD, Entomologist and Chief of Bureau.

CLASSIFICATION OF THE ALEYRODIDÆ.

PART II.

BY

A. L. QUAINANCE,

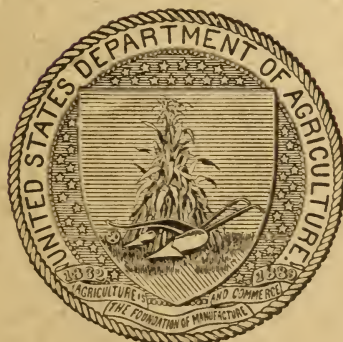
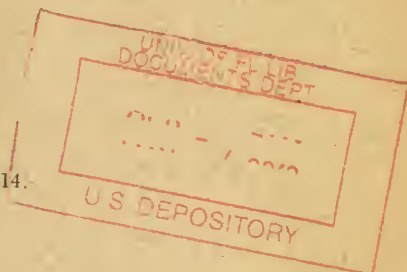
In Charge of Deciduous Fruit Insect Investigations,

AND

A. C. BAKER,

Expert.

ISSUED SEPTEMBER 9, 1914.



WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1914.



TECHNICAL SERIES, NO. 27, PART II.

U. S. DEPARTMENT OF AGRICULTURE,
BUREAU OF ENTOMOLOGY.

L. O. HOWARD, Entomologist and Chief of Bureau.

CLASSIFICATION OF THE ALEYRODIDÆ.

PART II.

BY

A. L. QUAINANCE,

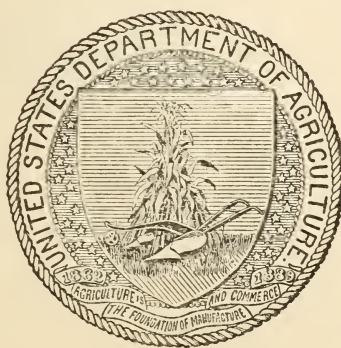
In Charge of Deciduous Fruit Insect Investigations,

AND

A. C. BAKER,

Expert.

ISSUED SEPTEMBER 9, 1914.



WASHINGTON:
GOVERNMENT PRINTING OFFICE.

1914.

BUREAU OF ENTOMOLOGY.

L. O. HOWARD, *Entomologist and Chief of Bureau.*

C. L. MARLATT, *Entomologist and Acting Chief in Absence of Chief.*

R. S. CLIFTON, *Chief Clerk and Executive Assistant.*

F. H. CHITTENDEN, *in charge of truck crop and stored product insect investigations.*

A. D. HOPKINS, *in charge of forest insect investigations.*

W. D. HUNTER, *in charge of southern field crop insect investigations.*

F. M. WEBSTER, *in charge of cereal and forage insect investigations.*

A. L. QUAINANCE, *in charge of deciduous fruit insect investigations.*

E. F. PHILLIPS, *in charge of bee culture.*

A. F. BURGESS, *in charge of gipsy moth and brown-tail moth investigations.*

ROLLA P. CURRIE, *in charge of editorial work.*

MABEL COLCORD, *in charge of library.*

CONTENTS.

	Page.
Introduction.....	95
Genera of the Aleurodinae.....	96
Genus <i>Dialeurodes</i>	97
Species of the genus <i>Dialeurodes</i>	97
Genus <i>Aleuroplatus</i>	98
Species of the genus <i>Aleuroplatus</i>	98
Genus <i>Dialeurodoidea</i>	98
Species of the genus <i>Dialeurodoidea</i>	99
Genus <i>Pealius</i>	99
Species of the genus <i>Pealius</i>	99
Genus <i>Bemisia</i>	89
Species of the genus <i>Bemisia</i>	100
Genus <i>Aleyrodes</i>	100
Species of the genus <i>Aleyrodes</i>	100
Genus <i>Aleurocybotus</i>	101
Species of the genus <i>Aleurocybotus</i>	101
Genus <i>Aleurotulus</i>	101
Species of the genus <i>Aleurotulus</i>	102
Genus <i>Aleurocanthus</i>	102
Species of the genus <i>Aleurocanthus</i>	102
Genus <i>Aleurotrachelus</i>	103
Species of the genus <i>Aleurotrachelus</i>	103
Genus <i>Aleurothrixus</i>	103
Species of the genus <i>Aleurothrixus</i>	103
Genus <i>Neomaskellia</i>	104
Species of the genus <i>Neomaskellia</i>	104
Genus <i>Aleuroparadoxus</i>	104
Species of the genus <i>Aleuroparadoxus</i>	104
Genus <i>Asterochiton</i>	104
Species of the genus <i>Asterochiton</i>	105
Genus <i>Aleurothrips</i>	106
Species of the genus <i>Aleurothrips</i>	106
Genus <i>Tetraleurodes</i>	107
Species of the genus <i>Tetraleurodes</i>	108
Genus <i>Aleurolobus</i>	108
Species of the genus <i>Aleurolobus</i>	109
Unplaced species of the old genus <i>Aleyrodes</i>	109

ILLUSTRATIONS.

	Page.
PLATE XXXV. Figs. 1-14.— <i>Dialeurodes citri</i>	98
XXXVI. Figs. 1-6.— <i>Aleuroplatus quercus-aquaticæ</i> . Figs. 7-12.— <i>Pealius maskelli</i>	98
XXXVII. Figs. 1-6.— <i>Bemisia inconspicua</i> . Figs. 7-11.— <i>Dialeurodoides aureus</i>	98
XXXVIII. Figs. 1-13.— <i>Aleyrodes spiræoides</i>	98
XXXIX. Figs. 1-4.— <i>Aleuroparadoxus iridescens</i> . Figs. 5-8.— <i>Aleurocybotus graminicolus</i> . Figs. 9-11.— <i>Aleurocanthus spiniferus</i> .	102
XL. Figs. 1-9.— <i>Aleurotulus nephrolepidis</i>	102
XLI. Figs. 1-6.— <i>Aleurothrixus howardi</i> . Figs. 7-9.— <i>Aleurotrachelus tracheifer</i>	102
XLII. Figs. 1-15.— <i>Asterochiton vaporariorum</i>	102
XLIII. Figs. 1-16.— <i>Aleurotithius timberlakei</i>	106
XLIV. Figs. 1-17.— <i>Tetraleurodes mori</i>	106
XLV. Figs. 1-16.— <i>Aleurolobus marlatti</i>	106
XLVI. Fig. 1.— <i>Dialeurodes citri</i> : Pupa case on leaf. Fig. 2.— <i>Aleuroparadoxus iridescens</i> : Pupa case on leaf. Fig. 3.— <i>Aleurocanthus spiniferus</i> : Pupa case on leaf. Fig. 4.— <i>Aleurotrachelus tracheifer</i> : Pupa case on leaf. Fig. 5.— <i>Pealius kelloggi</i> : Pupa case on leaf. Fig. 6.— <i>Aleyrodes spiræoides</i> : Pupa case on leaf.....	106
XLVII. Fig. 1.— <i>Aleurolobus marlatti</i> : Pupa case on leaf. Fig. 2.— <i>Asterochiton abutilonea</i> : Pupa case on leaf. Fig. 3.— <i>Tetraleurodes mori</i> : Pupa case on leaf. Fig. 4.— <i>Aleurothrixus howardi</i> : Pupa case on leaf.....	106
XLVIII. <i>Aleurotithius timberlakei</i> , showing infestation of underside of leaves of <i>Eridictyon tomentosum</i>	106

CLASSIFICATION OF THE ALEYRODIDÆ—PART II.

INTRODUCTION.

The present paper deals with the subfamily Aleyrodinæ and, with Part I, completes the classification of the family. It has not been feasible to treat at this time the species of this subfamily in the manner followed in Part I. Monographic reports of the respective genera of the Aleyrodinæ are, however, now under way and will be issued as rapidly as practicable.

Students of the Aleyrodidæ are well aware that the original and typical genus *Aleyrodes* had come to include a rather heterogeneous assemblage of forms. This fact was indicated some years ago by Prof. T. D. A. Cockerell in his paper, "Classification of the Aleyrodidæ,"¹ in which several subgenera were proposed, as *Dialeurodes*, *Tetraleurodes*, etc. From the writers' studies of these insects it appears to them that *Aleyrodes* Latreille should be restricted to those species essentially like *proletella* L., the type species, and that other genera should be erected to include the remaining forms. This they have attempted to do, as set forth in the following pages.

Unfortunately the Aleyrodidæ are as yet largely known only from the pupal stage, a condition due to their mode of life. A comprehensive classification based on the study of the adults would not, therefore, be possible for many years to come. In the generic diagnoses given herewith it has been necessary to place importance on the characters of the so-called pupa case, as has long been the practice in describing species of this family. In the majority of the genera proposed the adult stage of one or more species, however, is known, and so far as data at hand indicate, adult characters confirm the grouping of species followed, as based on the characters of the pupa case.

The writers regret that there should be so many species (14 in number) which they are unable to assign satisfactorily to any genus by reason of inadequate descriptions, or failure of authors to describe in sufficient detail those characters of most value in generic determinations. It is much to be desired that descriptions of Aleyrodidæ be made as complete and full as possible.

It should be added that careful examinations have been made of the types or cotypes of species described by Maskell, Bemis, Quaintance, Britton, Morrill, Back, Kuwana, and Kotinsky, and of most of those described by Cockerell.

¹ Proc. Acad. Nat. Sci., Phila., p. 279 (1902).

GENERA OF THE ALEYRODINÆ.

- I. Forewing of adult with radius₁ present as a distinct vein *Aleurochiton*.
- II. Forewing of adult without radius₁.
 - A. Pupa case without a submarginal row of papilla-like pores, and with dorsal disk not separated from submarginal area.
 1. Pupa case with thoracic tracheal folds present.
 - a. Thoracic tracheal folds ending on or near the margin in a more or less circular pore.
 - (1) Vasiform orifice relatively small and roundly subcordate, operculum almost filling orifice and obscuring lingula..... *Dialeurodes*.
 - b. Thoracic tracheal folds ending in a comb of teeth.
 - (1) Vasiform orifice relatively small and transversely rounded, the operculum almost entirely filling it..... *Aleuroplatus*.
 - (2) Vasiform orifice subcordate, acute caudad, the operculum filling about two-thirds of orifice and leaving caudal portion of lingula exposed..... *Dialeurodoides*.
 2. Pupa case with thoracic tracheal folds not evident.
 - a. Vasiform orifice situated in a pit or depression which is usually transversely ribbed or furrowed.
 - (1) Operculum transversely rectangular, small, the knobbed extremity of the lingula visible caudad of it..... *Pealius*.
 - b. Vasiform orifice not situated in a pit.
 - (1) Vasiform orifice triangular, very elongate, operculum small and transversely elliptical, lingula long and visible for fully half its length caudad of operculum..... *Bemisia*.
 - (2) Vasiform orifice subcordate, with cephalic margin straight.
 - (a) Adults with antennæ of seven segments, of which III is the longest, IV-VII being subequal... *Aleyrodes*.
 - (b) Adults with antennæ of seven segments, of which VII (in male) is much the longest, being as long as the remaining ones together..... *Aleurocybotus*.
 - (3) Vasiform orifice small, roundly subcordate, or subcircular.
 - (a) Lingula long and distally knobbed, extending caudad from orifice for one-third to one-half of its length. *Aleurotulus*.
 - (b) Lingula short and obscured by the operculum, which almost entirely fills the orifice.
 - * Dorsum with several series of prominent spines; margin with very distinct teeth... *Aleurocanthus*.
 - * Dorsum without such series of prominent spines.
 - ** Dorsum with a central ridge or trachea-like elevation, the orifice situated on its caudal extremity; margin with a double series of teeth, the outer series lighter in color than the inner. Wax not abundant. *Aleurotrachelus*.
 - ** Dorsum without such a central trachea-like structure, but usually with several pairs of prominent spine-like hairs. Wax secretion very abundant, flocculent, or woolly. *Aleurothrixus*.
 - (4) Vasiform orifice transversely rectangular; operculum similar, very short; lingula broad and short, truncate caudad. *Neomaskellia*.

B. Pupa case with a submarginal row of papilla-like pores and with the dorsal disk not separated from the submarginal area.

1. Vasiiform orifice subcordate, with anterior margin straight.

a. Thoracic folds visible and ending in a comb of teeth; operculum nearly filling the orifice and obscuring the lingua.

Aleuoparadoxus.

b. Thoracic tracheal folds not distinct; lingua visible caudad of operculum, lobed.....*Asterochiton*.

C. Pupa case usually without a row of submarginal papillæ and with the dorsal disk distinctly separated from the submarginal area by a suture-like line or depression.

1. Dorsum covered with a large number of mammiform pores...*Aleurothius*.

2. Dorsum without large mammiform pores.

a. Vasiiform orifice rounded or cordate, elevated, and not surrounded by a lobed or palmate area.....*Tetraleurodes*.

b. Vasiiform orifice subcordate, surrounded by a definite lobed area with a channel extending caudad.....*Aleurolobus*.

Genus DIALEURODES (Cockerell) n. gen.

(Pl. XXXV, figs. 1-14; Pl. XLVI, fig. 1.)

Pupa case variable in size, elliptic to subcircular in outline; color usually yellowish, varying in some species to brownish; margin of case toothed, the wax tubes irregular in outline and but little developed; submarginal area not separated from dorsal disk; dorsum without papillæ or pores; tracheal folds evident, in some species very conspicuous, terminating on margin of case in a pore, the folds often showing dotlike, linear, or polygonal markings; wax secretion absent or very scant. Vasiiform orifice relatively small, transversely oval or subcircular, with or without comb of teeth on inner lateral and caudal margins; operculum large, mostly filling the orifice and obscuring the lingua.

Adult with one flexure in radial sector of forewing and no trace of media. Antennæ of seven segments, segment VII not distinctly shorter than segments IV, V, and VI, but usually longer than these. Sexes about equal in size, the claspers of male with a few prominent spines.

Type, *citri* Riley and Howard.

SPECIES OF THE GENUS DIALEURODES.

D. citri (Riley and Howard), Insect Life, vol. 5, p. 219 (1893). (Southern United States; Chile (?); China; India; Japan, etc.)

Syn.: *aurantii* Maskell.

D. citrifolii (Morgan), Spec. Bul. La. Agr. Exp. Sta., p. 70 (1893). (Southern United States; Cuba; Mexico.)

Syn.: *rubifera* Berger.

D. eugeniæ (Maskell), Trans. New Zealand Inst., vol. 28, p. 430 (1895). (India.)

D. fijiensis (Kotinsky), Bul. 2, Div. Ent., Board Comm. Agr. & Forestry, Hawaii, p. 100 (1907). (Fiji.)

D. fodiens (Maskell), Trans. New Zealand Inst., vol. 28, p. 433 (1895). (New Zealand.)

- D. kirkaldyi* (Kotinsky), Bul. 2, Div. Ent., Board Comm. Agr. & Forestry, Hawaii, p. 95 (1907). (Hawaii.)
D. struthanthi (Hempel), Ann. Mag. Nat. Hist. (7), vol. 7, p. 387 (1901). (Brazil.)
D. tokyonis (Kuwana), Pomona Journ. Ent., vol. 3, no. 4, p. 622 (1911). (Japan.)

Genus **ALEUROPLATUS** n. gen.

(Pl. XXXVI, figs. 1-6.)

Pupa case usually flat, medium to large in size, oval to subcircular in outline, often notched on cephalo-lateral margins; color yellowish, or more usually dark brown to blackish, many species variously dotted with darker markings; margin toothed, wax tubes moderately developed, incisions shallow; submarginal area not separated from dorsal disk; dorsum without prominent pores or papillæ, though some species show many minute porelike structures; thoracic tracheal folds evident, terminating on margin of case in a comb of teeth from which may arise pencils of wax, differing in color from the more or less amorphous wax surrounding the case and secreted by the marginal wax tubes. Vasiform orifice small, transversely rounded and almost filled by the operculum, which hides the lingula.

Adult with radial sector of forewing showing a single flexure; no spur of media.

Type, *quercus-aquaticæ* Quaintance.

SPECIES OF THE GENUS **ALEUROPLATUS**.

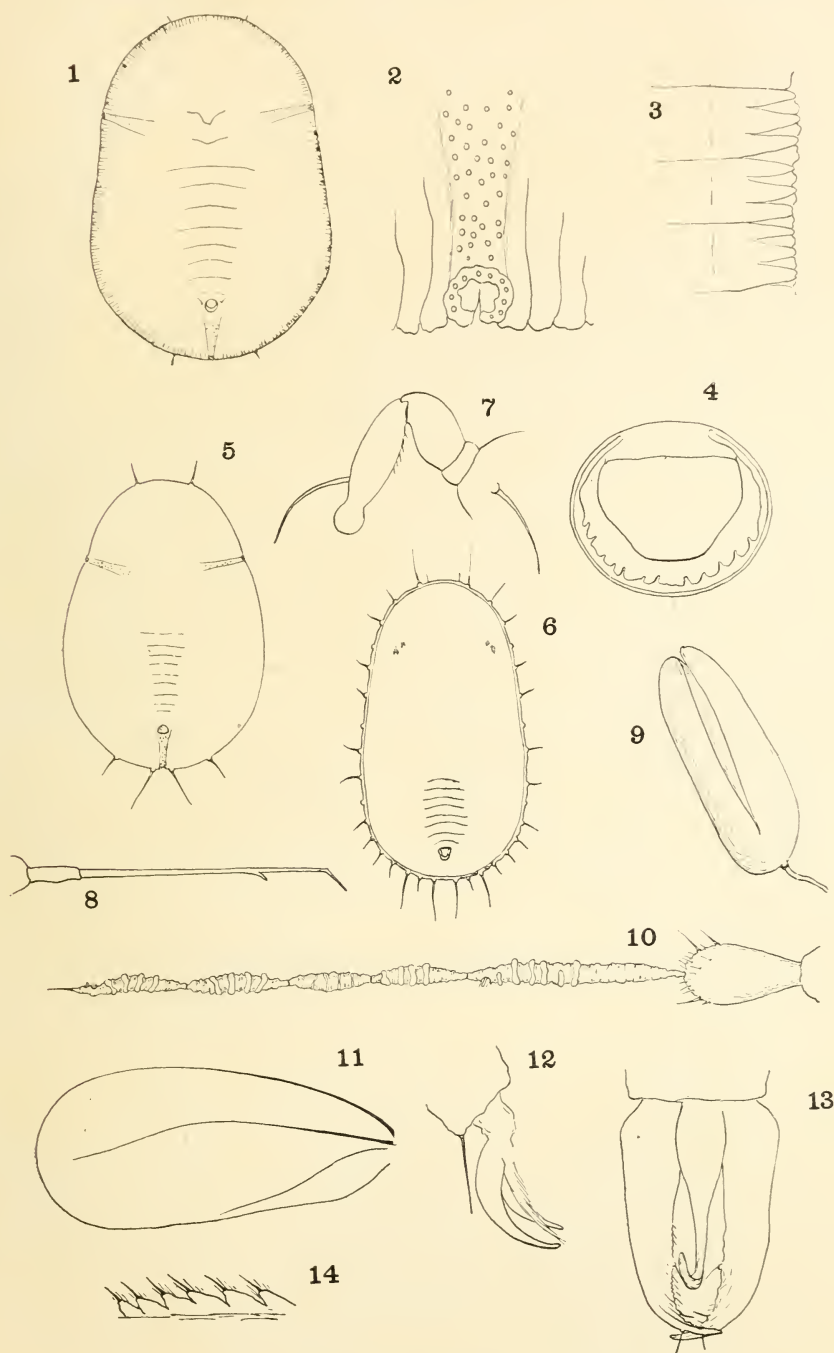
- A. alcocki* (Peal), Journ. Asiat. Soc. Bengal, vol. 72, p. 74 (1903). (India.)
A. cockerelli (Ihering), Rev. Museu Paulista, No. 2, p. 393 (1897). (Brazil.)
A. coronata (Quaintance), Tech. Ser. 8, Div. Ent., U. S. Dept. Agr., p. 22 (1900). (California.)
A. euryæ (Kuwana), Pomona Journ. Ent., vol. 3, no. 4, p. 625 (1911). (Japan.)
A. gelatinosus (Cockerell), Canad. Ent., vol. 30, p. 264 (1898). (New Mexico; California.)
A. hoyæ (Peal), Journ. Asiat. Soc. Bengal, vol. 72, p. 78 (1903).
A. quaintancei (Peal), Journ. Asiat. Soc. Bengal, vol. 72, p. 78 (1903). (India.)
A. quercus-aquaticæ (Quaintance), Tech. Ser. 8, Div. Ent., U. S. Dept. Agr., p. 35 (1900). (Florida.)
A. vinsonioides (Cockerell), Psyche, vol. 8, p. 225 (1898). (Mexico.)

Genus **DIALEURODOIDES** n. gen.

(Pl. XXXVII, figs. 7-11.)

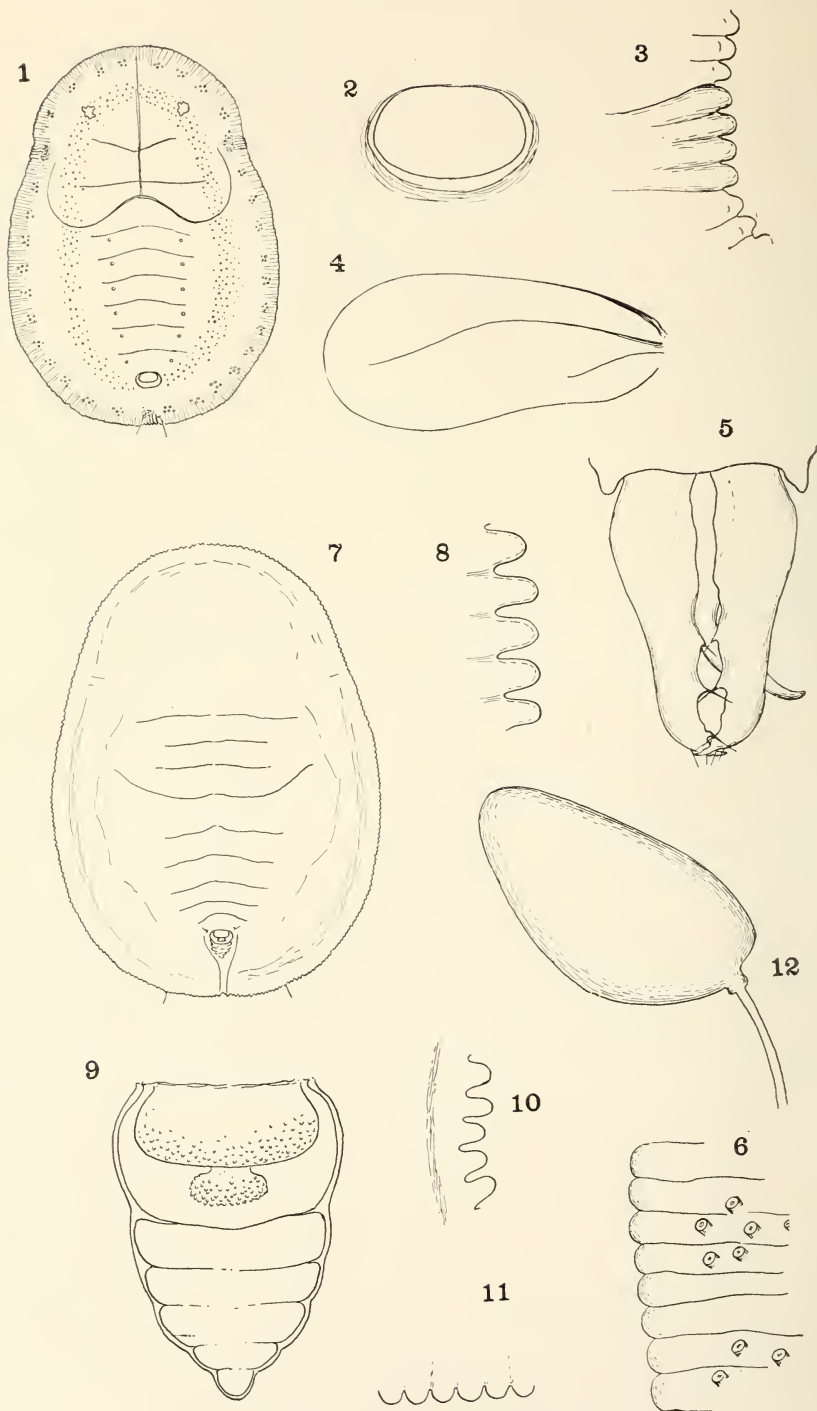
Pupa case of medium size, subelliptic to subcircular in outline, usually yellowish or brownish in color; margin of case toothed, the wax tubes but little developed; submarginal area not separated from dorsal disk; dorsum without papillæ, though well developed pores may be present; tracheal folds present; wax secretion scant or absent. Vasiform orifice subcordate, rather acute caudad; operculum about half filling the orifice, leaving lingula exposed.

Type, *aureus* Maskell.



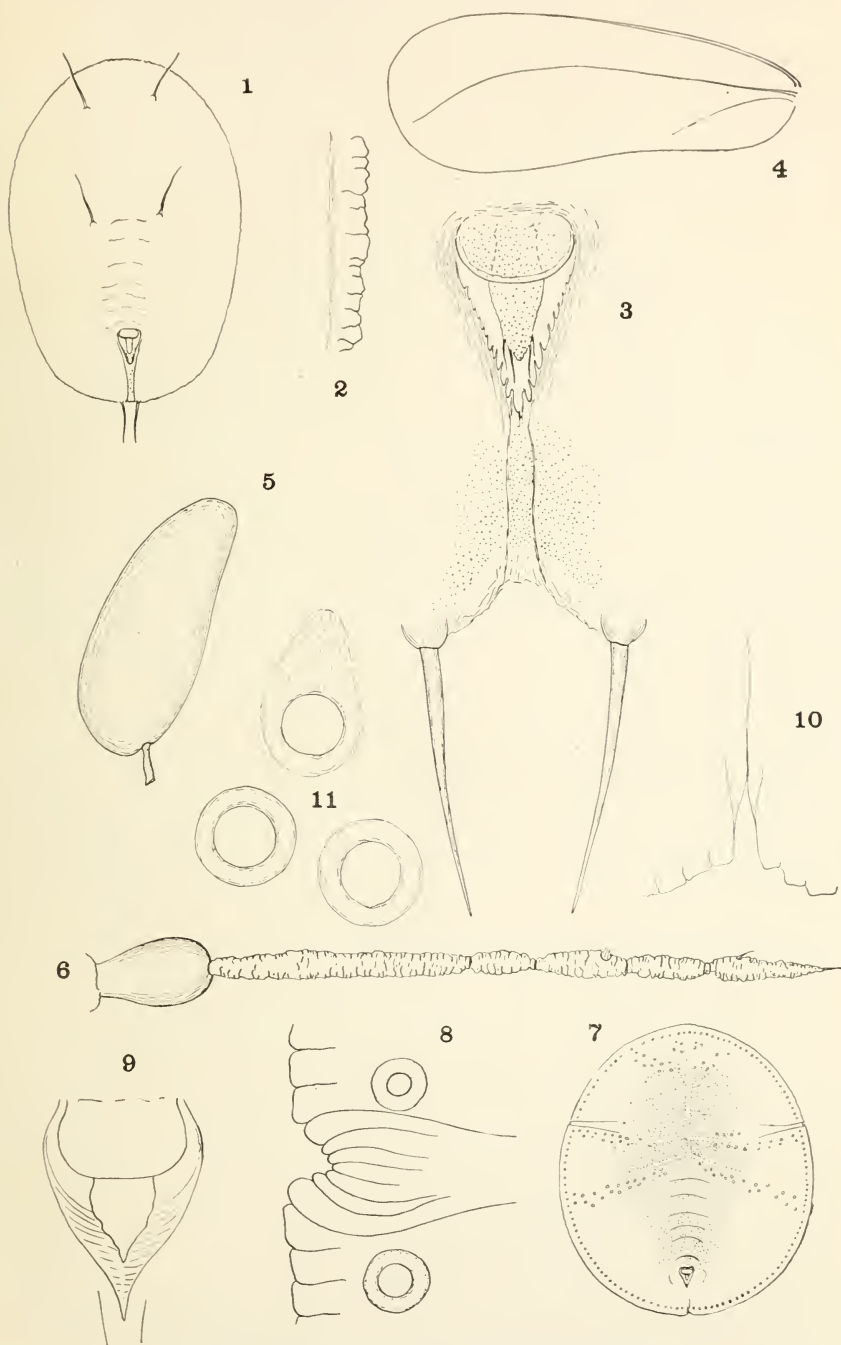
DIALEURODES CITRI.

Fig. 1.—Pupa case, dorsal view. Fig. 2.—Thoracic tracheal fold and pore. Fig. 3.—Margin of case. Fig. 4.—Vasiform orifice of pupa case. Fig. 5.—Larva, third instar. Fig. 6.—Larva, first instar. Fig. 7.—Leg of larva, first instar. Fig. 8.—Antenna of larva, first instar. Fig. 9.—Egg. Fig. 10.—Antenna of adult. Fig. 11.—Wing. Fig. 12.—Claw of adult. Fig. 13.—Male genitalia. Fig. 14.—Margin of forewing. (Original.)



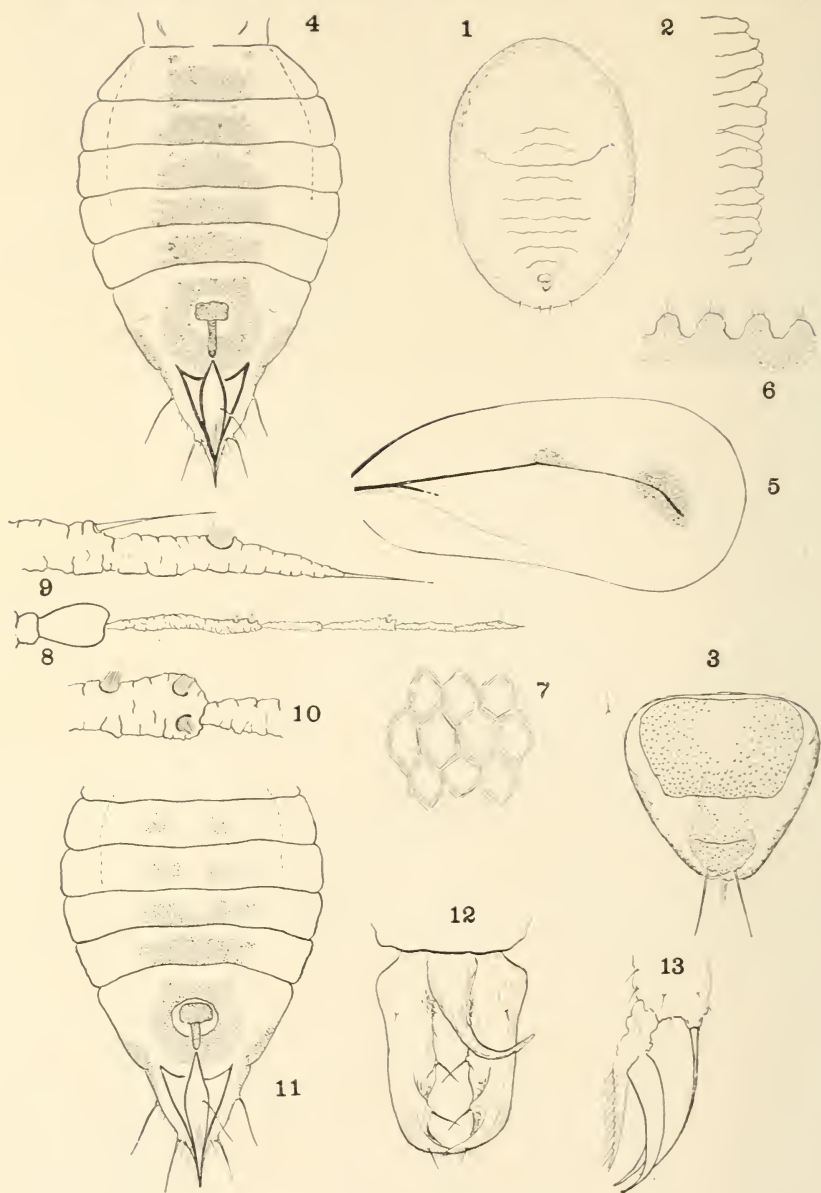
ALEUROPLATUS QUERCUS-AQUATICÆ AND PEALIUS MASKELLI.

Aleuroplatus quercus-aquaticæ: Fig. 1.—Pupa case, dorsal view. Fig. 2.—Vasiiform orifice. Fig. 3.—Thoracic tracheal comb of teeth. Fig. 4.—Forewing. Fig. 5.—Male genitalia. Fig. 6.—Margin of pupa case. *Pealius maskelli*: Fig. 7.—Pupa case, dorsal view. Fig. 8.—Margin of pupa case. Fig. 9.—Vasiiform orifice. Fig. 10.—Thoracic tracheal comb of teeth. Fig. 11.—Caudal comb of teeth. Fig. 12.—Egg. (Original.)



BEMISIA INCONSPICUA AND DIALEURODOIDES AUREUS.

Bemisia inconspicua: Fig. 1.—Pupa case, dorsal view. Fig. 2.—Margin of pupa case. Fig. 3.—Vasisform orifice and caudal end of pupa. Fig. 4.—Forewing. Fig. 5.—Egg. Fig. 6.—Antenna of adult. *Dialeurodoides aureus*: Fig. 7.—Pupa case, dorsal view. Fig. 8.—Tracheal comb of teeth. Fig. 9.—Vasisform orifice. Fig. 10.—Caudal margin of case. Fig. 11.—Pore of radial passage. (Original.)



ALEYRODES SPIRAEOIDES.

Fig. 1.—Pupa case, dorsal view. Fig. 2.—Margin of pupa case. Fig. 3.—Vasisform orifice of pupa case. Fig. 4.—Abdomen of female, dorsal view, showing typical marking. Fig. 5.—Forewing. Fig. 6.—Margin of forewing. Fig. 7.—Details of maculation of forewing. Fig. 8.—Antenna of adult female. Fig. 9.—Terminal distal segment of female, antenna greatly enlarged. Fig. 10.—Distal portion of third segment of male. Fig. 11.—Abdomen of female, dorsal view, showing variation in marking. Fig. 12.—Genitalia of male. Fig. 13.—Claw. (Original.)

SPECIES OF THE GENUS DIALEURODROIDES.

- A. aureus* (Maskell), Trans. New Zealand Inst., vol. 22, p. 174 (1889); *ibidem*, vol. 2, p. 215 (1879). (New Zealand.)
A. fagi (Maskell), Trans. New Zealand Inst., vol. 22, p. 175 (1889). (New Zealand.)
A. simplex (Maskell), Trans. New Zealand Inst., vol. 22, p. 175 (1889). (New Zealand.)

Genus PEALIUS n. gen.

(Pl. XXXVI, figs. 7-12; Pl. XLVI, fig. 5.)

Pupa case medium in size, elliptic in outline; color variable; margin of case toothed, the wax tubes well developed; submarginal area not separated from dorsal disk; dorsum without papillæ or pores; thoracic tracheal folds not discernible, though there is a distinct furrow from vasiform orifice to caudal end of case. Vasiform orifice situated in a pit, which is more or less pyriform in outline and transversely ridged, the outline of the orifice being subrectangular; operculum subrectangular, short, filling about half the orifice; lingula short, the distal extremity visible caudad of operculum, flattened and knobbed. Named for the late H. W. Peal.

Type, *maskelli* Bemis.

SPECIES OF THE GENUS PEALIUS.

- P. bengalensis* (Peal), Journ. Asiat. Soc. Bengal, vol. 72, p. 70 (1904). (India.)
P. hibisci (Kotinsky), Bul. 2, Div. Ent., Board Comm. Agr. & Forestry, Hawaii, p. 96 (1907). (Hawaii.)
P. kelloggi (Bemis), Proc. U. S. Nat. Mus., vol. 27, p. 499 (1904). (California.)
P. maskelli (Bemis), Proc. U. S. Nat. Mus., vol. 27, p. 524 (1904). (California.)

Genus BEMISIA n. gen.

(Pl. XXXVII, figs. 1-6.)

Pupa case varying much in size, elliptic or oval in outline, broadest across the thorax; color usually pale yellowish; margin toothed, the wax tubes irregular in size and shape; submarginal area not separated from dorsal disk; dorsum without papillæ or pores; thoracic tracheal folds sometimes faintly visible. There is a distinct furrow present, extending from the vasiform orifice to the caudal extremity of the case. Vasiform orifice triangular, long and narrow; lingula long and less than half covered at the cephalic extremity by the short operculum.

Adult with one flexure in radial sector of forewing and no spur of media. Antennæ of seven segments, of which the third is the longest, the remaining distal ones being subequal. Named for Florence E. Bemis.

Type, *inconspicua* Quaintance.

SPECIES OF THE GENUS BEMISIA.

- B. berbericola* (Cockerell), Journ. N. Y. Ent. Soc., vol. 4, p. 207 (1896). (New Mexico.)
B. decipiens (Maskell), Trans. New Zealand Inst., vol. 28, p. 428 (1895). (Australia.)
B. giffardi (Kotinsky), Bul. 2, Div. Ent., Board Comm. Agr. & Forestry, Hawaii, p. 94 (1907). (Hawaii.)
B. inconspicua (Quaintance), Tech. Ser. 8, Div. Ent., U. S. Dept. Agr., p. 29 (1900). (Florida.)
B. leakii (Peal), Journ. Asiat. Soc. Bengal, vol. 72, p. 87 (1903). (India; Fiji.)
B. religiosa (Peal), Journ. Asiat. Soc. Bengal, vol. 72, p. 67 (1903). (India.)

Genus ALEYRODES Latreille.

(Pl. XXXVIII, figs. 1-13; Pl. XLVI, fig. 6.)

Pupa case small to medium in size, elliptic in outline; color usually yellowish or brownish; margin of case toothed, the wax tubes irregular in outline and rather poorly developed; submarginal area not separated from dorsal disk. There are no well developed papillæ or pores as in *Asterochiton*, though minute pores may be present in some species. Tracheal folds not discernible; wax secretion usually absent. Vasoform orifice subcordate, the operculum about half filling the orifice; lingula included within the orifice, but visible caudad of the operculum; the distal extremity setose and armed with a pair of spines.

Adult with two flexures in radial sector of forewing, and media with a very short spur; forewings usually with faint patches of dusky coloration on flexures of radial sector. Antennæ of seven segments, of which the third is the longest, the distal ones being subequal; segments imbricated. Sexes nearly equal in size; claspers of male with a few spines.

Type, *proletella* L.; example, *spiræoides* Quaintance.

SPECIES OF THE GENUS ALEYRODES.

- A. akebiæ* Kuvana, Pomona Journ. Ent., vol. 3, no. 4, December, p. 622 (1911). (Japan.)
A. amnicola Bemis, Proc. U. S. Nat. Mus., vol. 27, p. 514 (1904). (California.)
A. asarumis Shimer, Trans. Amer. Ent. Soc., vol. 1, p. 281 (1867). (Pennsylvania.)
 Syn.: *actææ* Britton.
A. aureocincta Cockerell, Journ. N. Y. Ent. Soc., vol. 5, p. 42 (1897). (New Mexico.)
A. brassicæ Walker, Cat. Homopt. Brit. Mus., p. 1092 (1852). (Europe.)
A. caprææ Signoret, Ann. Soc. Ent. France (4), vol. 8, p. 384 (1867). (France.)
A. cerata Maskell, Trans. New Zealand Inst., vol. 28, p. 425 (1895). (New Zealand.)
A. cotesii Maskell, Trans. New Zealand Inst., vol. 28, p. 427 (1895). (Baluchistan.)
A. fernaldi Morrill, Psyche, vol. 10, p. 83 (1903). (Massachusetts; Connecticut.)
A. fragariæ Walker, List Homopt. Brit. Mus., p. 1092 (1851); also Ann. Soc. Ent. France (4), vol. 8, p. 383 (1867). (England; France.)

- A. lactea* Zehntner, Mededeeleng Proefstat. Oost-Java, n. s. 37, p. 34 (1897); also Arch. Java Suikerind., vol. 7, p. 459 (1897). (Java.)
A. lauri Signoret, Ann. Soc. Ent. France, pt. 2, p. 158 (1881). (Greece.)
A. lonicerae Walker, Cat. Homopt. Brit. Mus., p. 1092 (1852). (Europe.)
A. prenanthis Schrank, Fauna Boica, vol. 2, p. 147 (1801). (Germany.)
A. prolella Linné, Syst. Nat. (ed. 10), p. 537 (1758). (Europe.)
A. pruinosa Bemis, Proc. U. S. Nat. Mus., vol. 27, p. 491, pl. 2, fig. 8 (1904). (California.)
A. pruinosa var. *euphorbiara* Cockerell, Ent. News, vol. 22, p. 462 (1911).
A. pyrolæ Gillette & Baker, Bul. 31, Colo. Agr. Exp. Sta., Tech. Ser., p. 125 (1895). (Colorado.)
A. quercus Signoret, Ann. Soc. Ent. France (4), vol. 8, p. 384 (1867). (France; England.)
A. ribia Douglas, Ent. Monthl. Mag., vol. 24, p. 265 (1888); ibidem, p. 255 (1899). (England.)
A. rubi Signoret, Ann. Soc. Ent. France (4), vol. 8, p. 382 (1867). (France.)
A. rubicola Douglas, Ent. Monthl. Mag. (2), vol. 2, p. 322 (1891). (England.)
A. schizuokensis Kuwana, Pomona Journ. Ent., vol. 3, no. 4, December, p. 620 (1911). (Japan.)
A. spirææ Douglas, Ent. Monthl. Mag. (2), vol. 5, pp. 73, 154 (1894). (England.)
A. spiræoides Quaintance, Tech. Ser. 8, Div. Ent., U. S. Dept. Agr., p. 36 (1900).
A. xylostei Westhoff, Jahresb. zool. westfäl. Verein, p. 61 (1886). (Germany.)
A. youngi Hempel, Ann. Mag. Nat. Hist. (7), vol. 8, p. 385 (1901). (Brazil.)

Genus ALEUROCYPOTUS n. gen.

(Pl. XXXIX, figs. 5-8.)

Pupa case of medium size, very narrow and elongate; margin toothed, the wax tubes very poorly developed; submarginal area not separated from dorsal disk; dorsum without papillæ or pores, though there is present a row on each side of median area of abdomen, a series of irregular pits; tracheal folds not discernible; secretion usually present as a short rim of wax, elevating case from leaf. Vasiform orifice subcordate, the lingula included within the orifice, but its extremity visible caudad of the operculum.

Adult with a single flexure in radial sector of forewing and no trace of media. Antennæ of male with segment VII as long or longer than the other segments combined.

Type, *graminicolus* Quaintance.

SPECIES OF THE GENUS ALEUROCYPOTUS.

- A. graminicolus* (Quaintance), Canad. Ent., vol. 31, p. 89 (1899). (Florida.)

Genus ALEUROTULUS n. gen.

(Pl. XL, figs. 1-9.)

Pupa case small, elliptic to slightly oval, flat. Color yellowish; margin of case toothed, the wax tubes not prominent; submarginal area not separated from the dorsal disk and there are no papillæ or pores; tracheal folds faintly evident. Vasiform orifice subcordate, somewhat rounded; operculum smaller, similar but shorter in proportion, occupying about two-thirds of the orifice; lingula long,

usually protruding considerably beyond orifice, ligulate, its protruding extremity knobbed and setose.

Adult with one flexure in radial sector of forewing and no spur of media. Antennæ of seven segments, of which the third is the longest; segment VII considerably longer than IV, V, or VI.

Type, *nephrolepidis* Quaintance.

SPECIES OF THE GENUS ALEUROTULUS.

A. nephrolepidis (Quaintance), Tech. Ser. 8, Div. Ent., U. S. Dept. Agr., p. 29 (1900). (Pennsylvania, in Conservatory.)

Syn.: *extraniens* Bemis.

A. filicium (Goeldi), Mittheil. schweiz. ent. Ges., vol. 7, p. 248 (1886). (Brazil; Rio de Janeiro; Kew Gardens.)

Genus ALEUROCANTHUS n. gen.

(Pl. XXXIX, figs. 9-11; Pl. XLVI, fig. 3.)

Pupa case medium in size, subelliptic in outline, usually dark brown or black in color; margin of case toothed, the wax tubes very prominent; submarginal area not separated from dorsal disk; dorsum without papillæ or pores, though bearing many heavily chitinized spines variously arranged; tracheal folds usually not discernible, though evident in a few species; wax secretion usually present as a narrow fringe from marginal wax tubes. Vasiform orifice small, rounded or subcordate in outline, situated on a tubercle-like projection of dorsum; operculum similar in shape and almost entirely filling it, obscuring the lingua.

Adult with one flexure in radial sector of forewing and no spur of media; wings usually blotched or shaded. Males much smaller than females.

Type, *spiniferus* Quaintance.

SPECIES OF THE GENUS ALEUROCANTHUS.

A. bambusæ (Peal), Journ. Asiatic Soc. Bengal, vol. 72, p. 85 (1903). (India.)

A. banksiæ (Maskell), Trans. New Zealand Inst., vol. 28, p. 423 (1895). (Australia.)

A. calophylli (Kotinsky), Bul. 2, Div. Ent. Board Comm. Agr. & Forestry, Hawaii, p. 98 (1907). (Fiji.)

A. citricolus (Newstead), Mitteil. aus dem zool. Mus. in Berlin, vol. 5, pt. 2, p. 173 (1911). (East Africa.)

A. hirsutus (Maskell), Trans. New Zealand Inst., vol. 28, p. 434 (1895). (Australia.)

A. nubilans (Buckton), Indian Mus. Notes, vol. 5, p. 36 (1900). (India.)

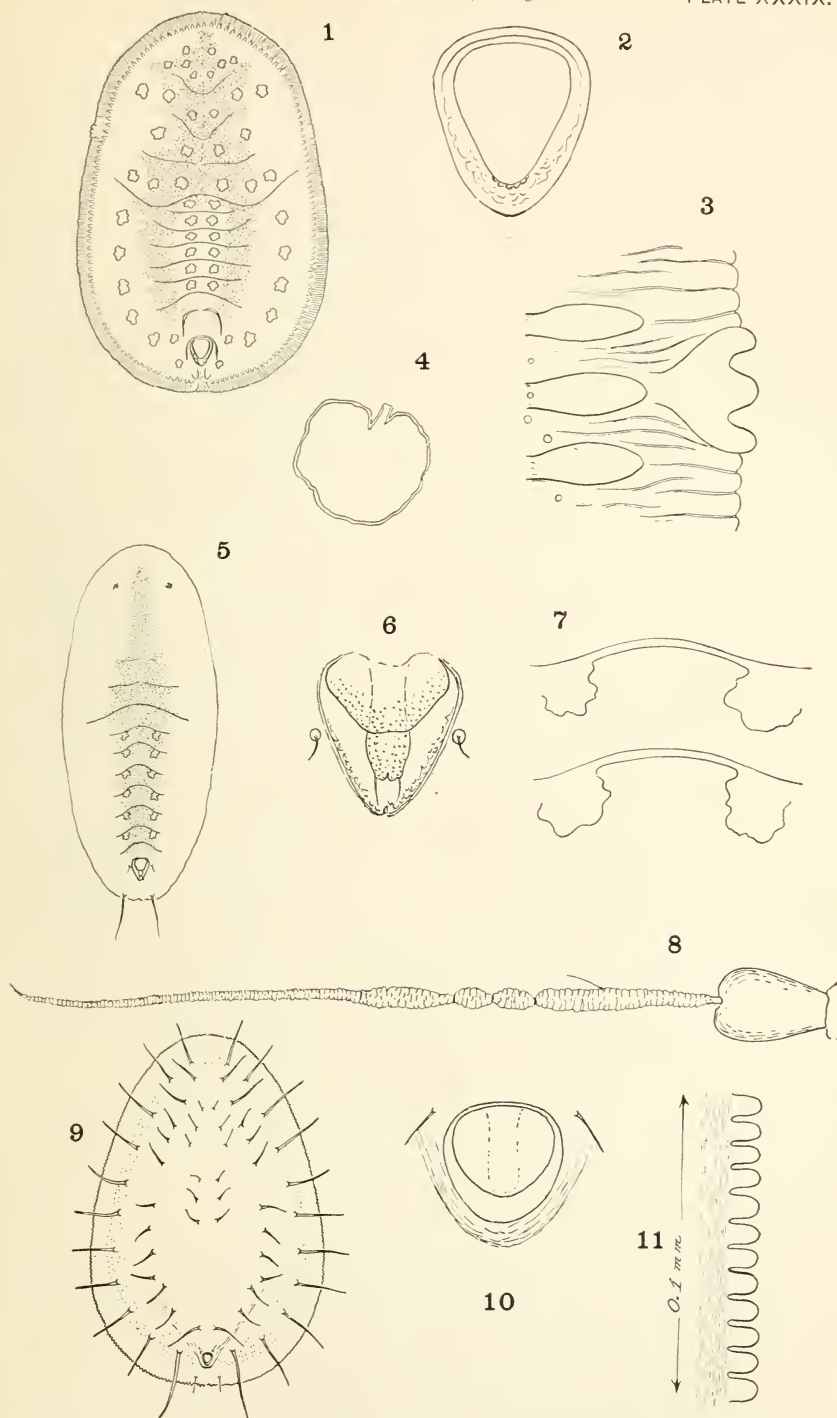
A. piperis (Maskell), Trans. New Zealand Inst., vol. 28, p. 438 (1895). (Ceylon.)

A. spiniferus (Quaintance), Canad. Ent., vol. 34, p. 63 (1902). (Java.)

A. spinosus (Kuwana), Pomona Journ. Ent., vol. 3, no. 4, p. 626 (1911).

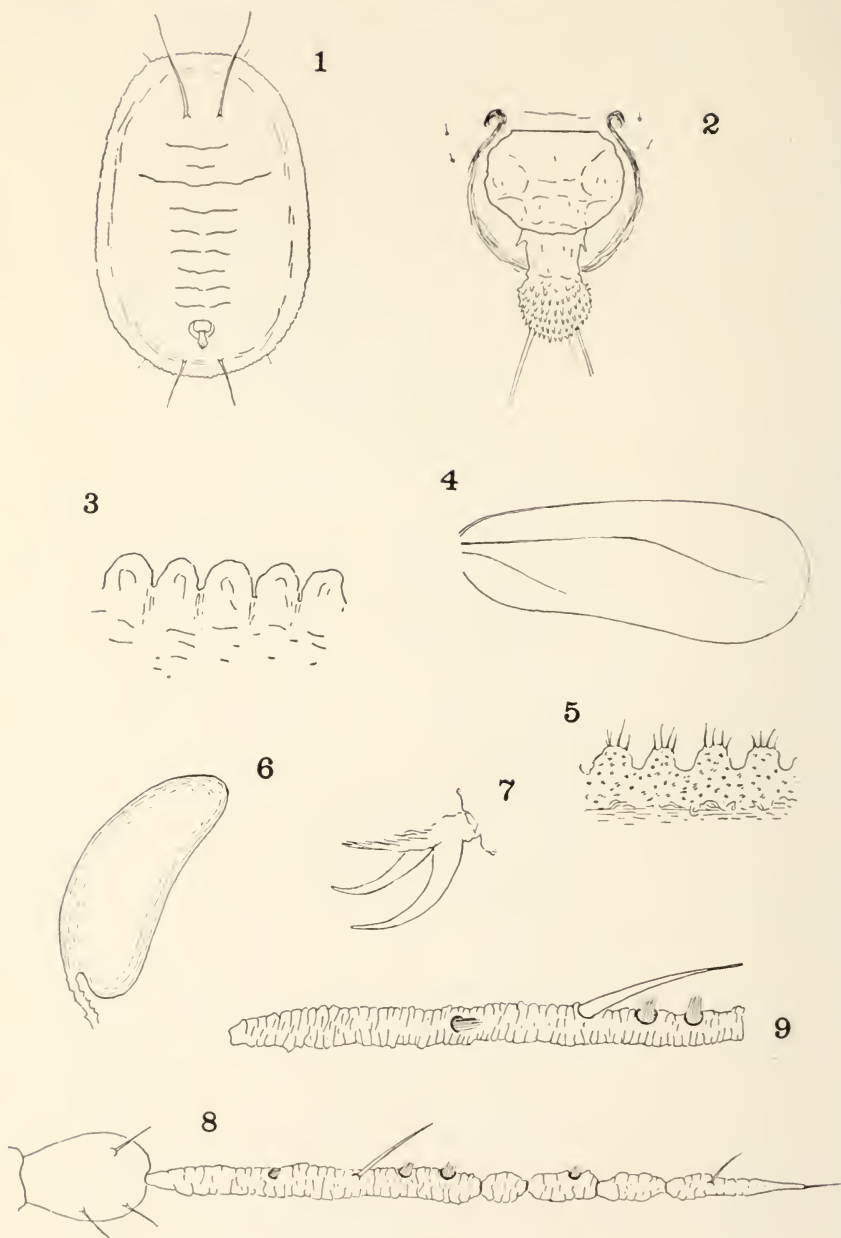
A. signatus (Maskell), Trans. New Zealand Inst., vol. 28, p. 447 (1895). (Australia.)

A. voeltzkowi (Newstead), Quarterly Journ. Liverpool, vol. 3, p. 12 (1908). (Madagascar.)



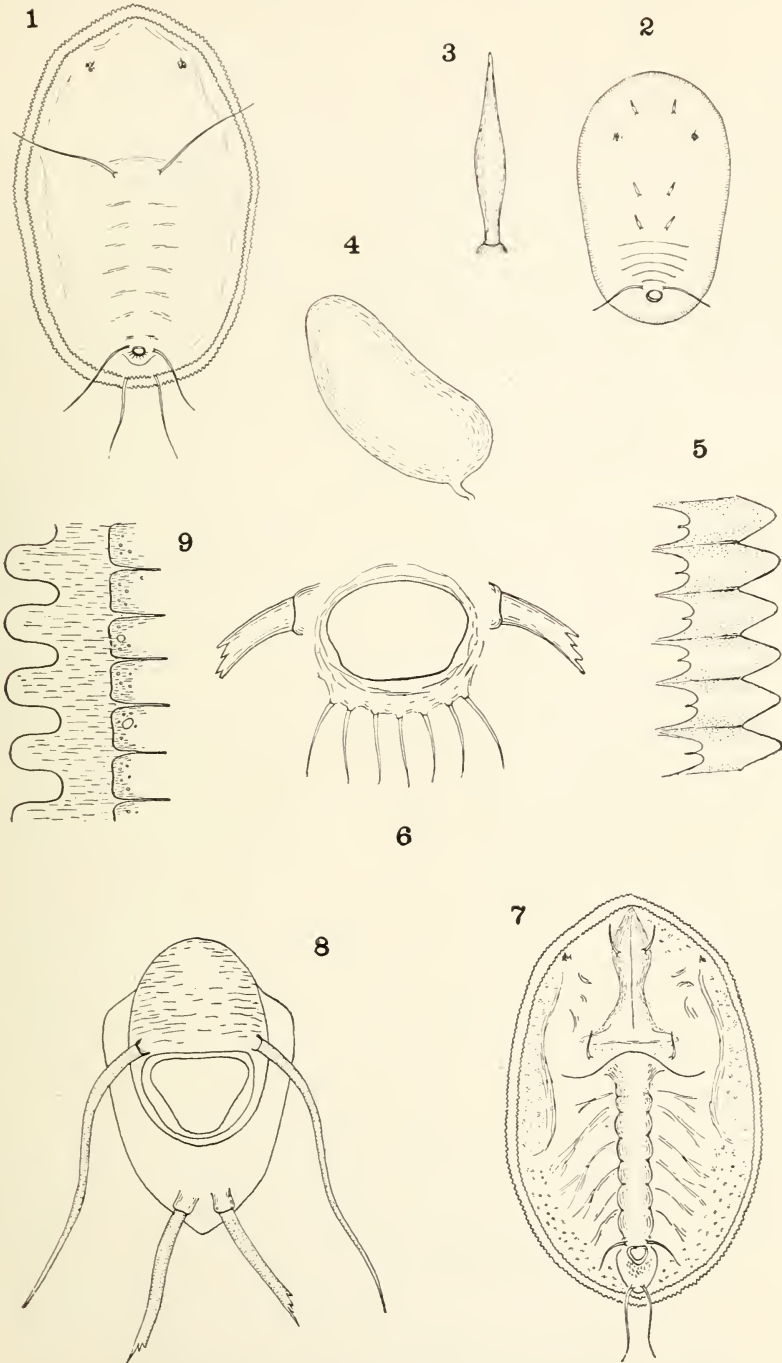
ALEUOPARADOXUS IRIDESCENS, ALEUROCYBOTUS GRAMINICOLUS, AND ALEUROCANTHUS SPINIFERUS

Aleuoparadoxus iridescens: Fig. 1.—Pupa case, dorsal view. Fig. 2.—Vasiform orifice. Fig. 3.—Margin of pupa case, showing thoracic tracheal comb. Fig. 4.—Dorsal pore of pupa case, much enlarged. *Aleurocybotus graminicolus*: Fig. 5.—Pupa case, dorsal view. Fig. 6.—Vasiform orifice. Fig. 7.—Irregular opening on dorsum of abdomen of pupa case. Fig. 8.—Antenna of adult male. *Aleurocanthus spiniferus*: Fig. 9.—Pupa case, dorsal view. Fig. 10.—Vasiform orifice. Fig. 11.—Margin of pupa case.



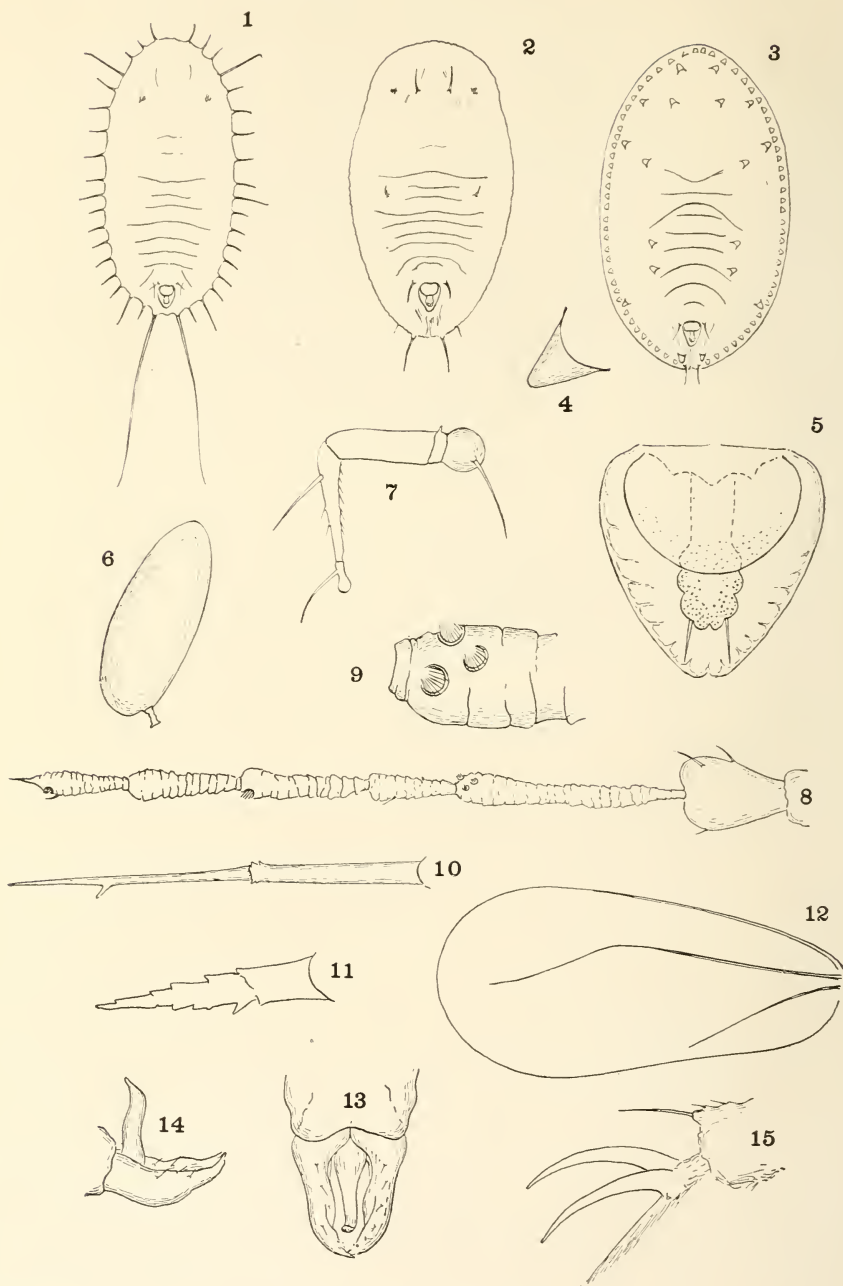
ALEUROTULUS NEPHROLEPIDIS.

Fig. 1.—Pupa case, dorsal view. Fig. 2.—Vasiiform orifice. Fig. 3.—Margin of pupa case. Fig. 4.—Forewing. Fig. 5.—Margin of forewing. Fig. 6.—Egg. Fig. 7.—Claw of adult. Fig. 8.—Antenna of adult male (?). Fig. 9.—Third segment of antenna of male. (Original.)



ALEUROTHRIXUS HOWARDI AND ALEUROTRACHELUS TRACHEIFER.

Aleurothrixus howardi: Fig. 1.—Pupa case, dorsal view. Fig. 2.—Larva, first instar. Fig. 3.—Sword-shaped spine of first-instar larva. Fig. 4.—Egg. Fig. 5.—Margin of pupa case. Fig. 6.—Vasiform orifice. *Aleurotrachelus tracheifer*: Fig. 7.—Pupa case, dorsal view. Fig. 8.—Vasiform orifice. Fig. 9.—Margin of pupa case. (Original.)



ASTEROCHITON VAPORARIORUM.

Fig. 1.—Larva, first instar. Fig. 2.—Larva, second instar. Fig. 3.—Pupa case, dorsal view. Fig. 4.—Papilla of pupa case. Fig. 5.—Vasiiform orifice. Fig. 6.—Egg. Fig. 7.—Leg of larva, first instar. Fig. 8.—Antenna of adult. Fig. 9.—Distal end of third segment of antenna. Fig. 10.—Antenna of larva, first instar. Fig. 11.—Antenna of larva, second instar. Fig. 12.—Forewing. Fig. 13.—Genitalia of male, dorsal view. Fig. 14.—Genitalia of male, lateral view. Fig. 15.—Claw of adult. (Original.)

Genus **ALEUROTRACHELUS** n. gen.

(Pl. XLI, figs. 7-9; Pl. XLVI, fig. 4.)

Pupa case mostly of medium size, elliptic in outline, the cephalic margin somewhat pointed; color brown to blackish; margin of case with a double row of teeth, the wax tubes well developed; submarginal area not separated from the dorsal disk; dorsum without pores or papillæ, though body sutures are very prominent and along each side near center there is a prominent fold. Along median line of dorsum is a trachea-like ridge, terminating cephalad in an arrow-shaped figure and caudad in the vasiform orifice. Tracheal folds not discernible; wax secretion usually present as a fringe from marginal wax tubes, Vasiform orifice small, broadly cordate; operculum similar in shape, obscuring the lingula.

Type, *tracheifer* Quaintance.

SPECIES OF THE GENUS ALEUROTRACHELUS.

- A. camelliae* (Kuwana), Pomona Journ. Ent., vol. 3, no. 4, p. 625 (1911).
A. croceatus (Maskell), Trans. New Zealand Inst., vol. 28, p. 428 (1895). (Australia.)
A. fumipennis (Hempel), Psyche, vol. 8, p. 394 (1899). (Brazil.)
A. limbatus (Maskell), Trans. New Zealand Inst., vol. 28, p. 436 (1895). (Australia.)
A. parvus (Hempel), Psyche, vol. 8, p. 395 (1899). (Brazil.)
A. tracheifer (Quaintance), Tech. Ser. 8, Div. Ent., U. S. Dept. Agr., p. 38 (1900). (Mexico.)
A. trachoides (Back), Canad. Ent., vol. 44, p. 151 (1912). (Cuba.)

Genus **ALEUROTHRIXUS** n. gen.

(Pl. XLI, figs. 1-6; Pl. XLVII, fig. 4.)

Pupa case medium to small in size, elliptic; margin sometimes angled; color variable, ranging from yellow to blackish; margin of case with double row of teeth, the wax tubes well developed; submarginal area not separated from dorsal disk; dorsum without papillæ or pores, but bearing along median line a few pairs of long, spinelike hairs; tracheal folds not discernible; wax secretion usually copious, flocculent or woolly, secreted by marginal wax tubes. Vasiform orifice small, transversely elliptic; lingula obscured by the operculum, which nearly fills the orifice.

Adult with one flexure in radial sector of forewing and no spur of media. Antennæ of seven segments, of which III is the longest. Sexes nearly equal in size.

Type, *howardi* Quaintance.

SPECIES OF THE GENUS ALEUROTHRIXUS.

- A. æpim* (Goeldi), Mittheil. schweiz. ent. Ges., vol. 7, p. 250 (1886). (Brazil.)
A. floccosus (Maskell), Trans. New Zealand Inst., vol. 28, p. 432 (1895). (Jamaica; Mexico.)
A. horridus (Hempel), Psyche, vol. 8, p. 394 (1899). (Brazil.)

- A. howardi* (Quaintance), Tech. Ser. 12, Bur. Ent., U. S. Dept. Agr., p. 91 (1907). (Cuba; Florida.)
A. interrogationis (Bemis), Proc. U. S. Nat. Mus., vol. 27, p. 510 (1904). (California.)

Genus NEOMASKELLIA Quaintance and Baker.

(Tech. Ser. 27, Pt. I, Pl. XXXIV, figs. 1-8.)

SPECIES OF THE GENUS NEOMASKELLIA.

- N. comata* (Maskell), Trans. New Zealand Inst., vol. 28, p. 426, (1895). (Fiji.)
N. bergii (Signoret), Ann. Soc. Ent. France (4), vol. 8, p. 395 (1867). (Isle of Mauritius; Java; Fiji; Levuka; Rena; Manila, Philippine Islands.
 Syn.: *sacchari* Maskell.

Genus ALEUROPARADOXUS n. gen.

(Pl. XXXIX, figs. 1-4; Pl. XLVI, fig. 2.)

Pupa case medium in size, elliptic in outline, margin toothed, the wax tubes only moderately developed; submarginal area not separated from dorsal disk; just within margin a series of papilla-like pores and dorsum with numerous large irregular pores; tracheal folds present, terminating on margin in a comb of teeth; wax secretion brittle glass-like rods from the submarginal papillæ and a secretion from the dorsal pores. Vasiform orifice subcordate or triangular, the operculum similar in outline, obscuring the lingula.

Adult with a single flexure in radial sector of forewing and no spur of media. Antennæ seven-segmented; III the longest; distal segments subequal. Sexes nearly equal in size.

Type, *iridescens* Bemis.

SPECIES OF THE GENUS ALEUROPARADOXUS.

- A. iridescens* (Bemis), Proc. U. S. Nat. Mus., vol. 27, p. 487 (1904). (California.)

Genus ASTEROCHITON Maskell.¹

(Pl. XLII, figs. 1-15; Pl. XLVII, fig. 2.)

Pupa case medium to small in size, elliptic, usually elevated from the leaf by a palisade of white wax; color variable, ranging from whitish to dark brown; margin of case toothed, the wax tubes moderately developed; submarginal area not separated from dorsal disk; submarginal area with a row of, or a number of, large papillæ or pores; thoracic tracheal folds rarely distinguishable; usually a distinct furrow from vasiform orifice to caudal margin of case; wax secretion a series of brittle, glassy rods from dorsal papillæ or pores and a

¹ Maskell erected this genus with his *lecanioides* as type and placed it in the Coccidæ. He later described a species, *papillifer*, indicating that his *lecanioides* was in part a synonym of this. The name *lecanioides*, however, should have been used for the species. We have examined the type of *papillifer* in the Maskell collection and find the species to be nothing other than *vaporariorum* Westwood. This latter species, therefore, becomes the type of the genus.

palisade of white wax elevating case from leaf; vasiform orifice subcordate, usually notched on caudal end; operculum transversely elliptic, about half filling the orifice; lingula spatulate, the distal extremity exposed caudad of operculum, lobed, and usually armed with two prominent spines.

Adult usually with one flexure in radial sector of forewing and no trace of media excepting in freshly emerged specimens. Antennæ of seven segments, segment III the longest, IV to VI subequal; segments imbricated. Sexes nearly equal in size.

Type, *vaporariorum* Westwood.

SPECIES OF THE GENUS ASTEROCHITON.

A. abutiloneus (Haldeman), Amer. Journ. Sci. & Arts, vol. 9, p. 108 (1850). (Eastern United States; Pennsylvania to Florida.)

Syn.: *fitchi* Quaintance.

A. ambrosiæ (Cockerell), Canad. Ent., vol. 42, p. 370 (1910). (Colorado.)

A. asplenii (Maskell), Trans. New Zealand Inst., vol. 22, p. 173 (1889). (New Zealand.)

A. coryli (Britton), Ent. News (Phila.), vol. 18, p. 337 (1907). (Connecticut.)

A. diasemus (Bemis), Proc. U. S. Nat. Mus., vol. 27, p. 516 (1904). (California.)

A. dubius (Heeger), Beitr. Naturg. Ins., p. 223 (1858). (Austria; Germany.)

A. erigerontis (Maskell), Trans. New Zealand Inst., vol. 28, p. 429 (1895). (Mexico.)

A. floridensis (Quaintance), Tech. Ser. 8, Div. Ent., U. S. Dept. Agr., p. 26 (1900).

A. glacialis (Bemis), Proc. U. S. Nat. Mus., vol. 27, p. 518 (1904). (California.)

A. hutchingsi (Bemis), Proc. U. S. Nat. Mus., vol. 27, p. 532 (1904). (California.)

A. immaculatus (Heeger), Beitr. Naturg. Ins., p. 1 (1855). (Europe.)

A. madroni (Bemis), Proc. U. S. Nat. Mus., vol. 27, p. 507 (1904). (California.)

A. merlini (Bemis), Proc. U. S. Nat. Mus., vol. 27, p. 512 (1904). (California.)

A. morrilli (Britton), Ent. News (Phila.), vol. 18, p. 340 (1907). (Connecticut.)

A. packardi (Morrill), Canad. Ent., vol. 35, p. 25 (1903). (Eastern United States.)

A. pergandei (Quaintance), Tech. Ser. 8, Div. Ent., U. S. Dept. Agr., p. 31 (1900).

A. phillyreæ (Haliday), The Ent. Mag., vol. 2, p. 119 (1834). (Europe.)

A. rolfii (Quaintance), Canad. Ent., vol. 31, p. 90 (1899). (Florida.)

A. ruborum (Cockerell), Journ. N. Y. Ent. Soc., vol. 5, p. 9 (1897). (Florida.)

A. sonchi (Kotinsky), Bul. 2, Div. Ent. Board Comm. Agr. & Forestry, Hawaii, p. 97 (1907). (Hawaii.)

A. tentaculatus (Bemis), Proc. U. S. Nat. Mus., vol. 27, p. 494 (1904). (California.)

A. vaporariorum (Westwood), The Gardener's Chronicle, p. 852 (1856). (Thought to be a native of Brazil; now quite generally distributed.)

Syn.: *nicotianæ* Maskell.

Syn.: *papillifer* Maskell.

Syn.: *lecanioides* Maskell.

A. variabilis (Quaintance), Tech. Ser. 8, Div. Ent., U. S. Dept. Agr., p. 39 (1900). (Florida.)

A. vitrinellus (Cockerell), Ent. News (Phila.), vol. 14, p. 241 (1903). (Mexico.)

A. vittatus (Quaintance), Tech. Ser. 8, Div. Ent., U. S. Dept. Agr., p. 42 (1900). (California.)

A. waldeni (Britton), Ent. News (Phila.), vol. 18, p. 339 (1907). (Connecticut.)

A. wellmanæ (Bemis), Proc. U. S. Nat. Mus., vol. 27, p. 525 (1904). (California.)

Genus **ALEUROTITHIUS** n. gen.

(Pl. XLIII, figs. 1-16, Pl. XLVIII.)

Pupa case of medium size, elliptic in outline, yellowish to darker in color; margin toothed, the wax tubes but little developed; submarginal area separated from dorsal disk by an irregular row of small papillæ and marked by many suture-like lines; dorsal disk covered with patches of large mammiform papillæ; tracheal folds not discernible, wax secretion copious, of wool-like threads from the dorsal papillæ. Vasiform orifice broadly subcordate, the operculum about half filling it; caudal extremity of lingula exposed, lobed, and bearing a pair of spines.

Adult with one flexure in radial sector of forewing and no trace of media; antennæ of seven segments, of which the third is the longest, the four distal segments subequal. Ovipositor and labium extremely long.

Type, *timberlakei* Quaintance and Baker.

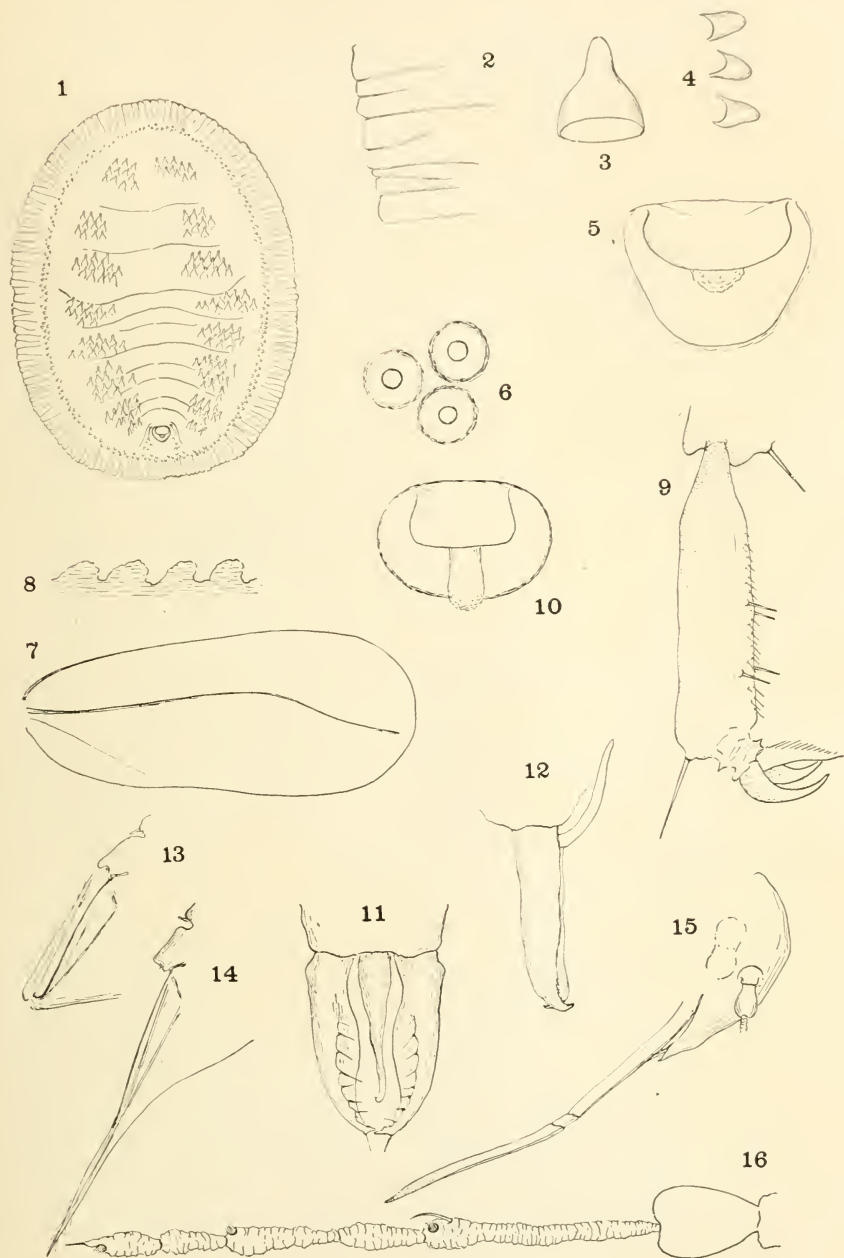
SPECIES OF THE GENUS **ALEUROTITHIUS**.**Aleurotithius timberlakei** n. sp.

(Pl. XLIII, figs. 1-16; Pl. XLVIII.)

This species is represented in the collection by three lots of material. The first, Quaintance No. 8732, was collected by Mr. P. H. Timberlake, July 14, 1912, in the upper Sonoran Zone, San Jacinto Mountains, California. The second, Quaintance No. 8818, was forwarded by H. S. Smith and represents specimens collected by Mr. R. K. Bishop at Santa Ana, Cal. The third lot was sent by Mr. Bishop from Santa Ana, May, 1913. All specimens were collected on *Eriodictyon tomentosum*, commonly known as *Yerba santa*.

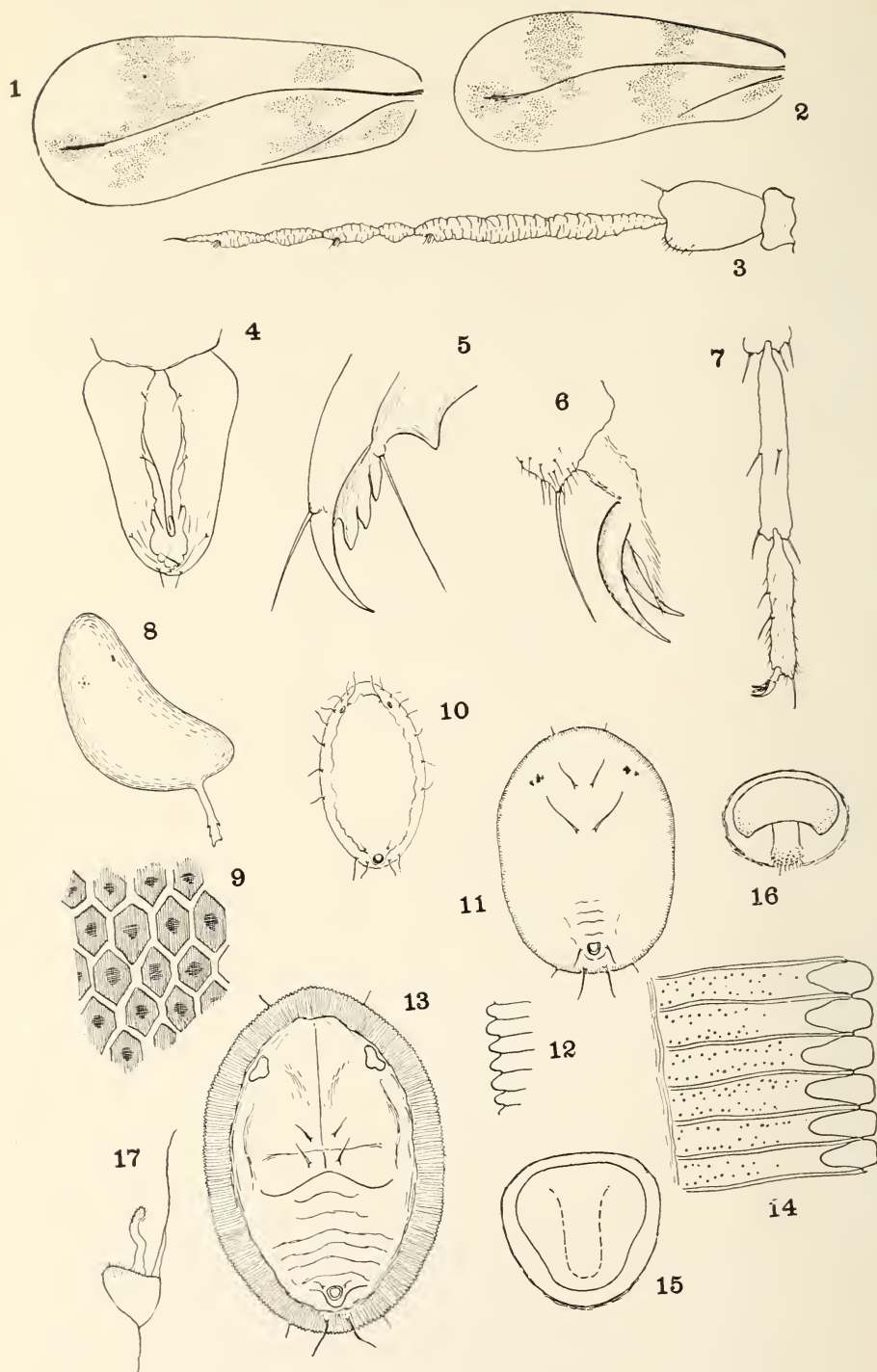
Pupa case (Pl. XLIII, fig. 1).—Size 1.008 by 0.72 mm.; shape elliptic; color pale yellowish. Submarginal area separated from dorsal disk by a series of small more or less conical papillæ (Pl. XLIII, fig. 4). Margin with the wax tubes as irregular teeth (Pl. XLIII, fig. 2) from which suture-like markings extend mesad across the submarginal area. Dorsum with the segments distinctly marked and possessing large numbers of prominent mammiform papillæ (Pl. XLIII, fig. 3). These are situated in groups on the subdorsal portions of the segments. Vasiform orifice (Pl. XLIII, fig. 5) broadly subcordate, with the anterior margin straight. Operculum similar in shape to the orifice and filling about one-third of it; distal extremity of the lingula exposed, and setose.

As seen on the leaf, there is a prominent rim of waxy secretion which elevates the case extremely from the leaf and there is an abundant dorsal secretion composed of more or less fused waxen rods from the mammiform papillæ.



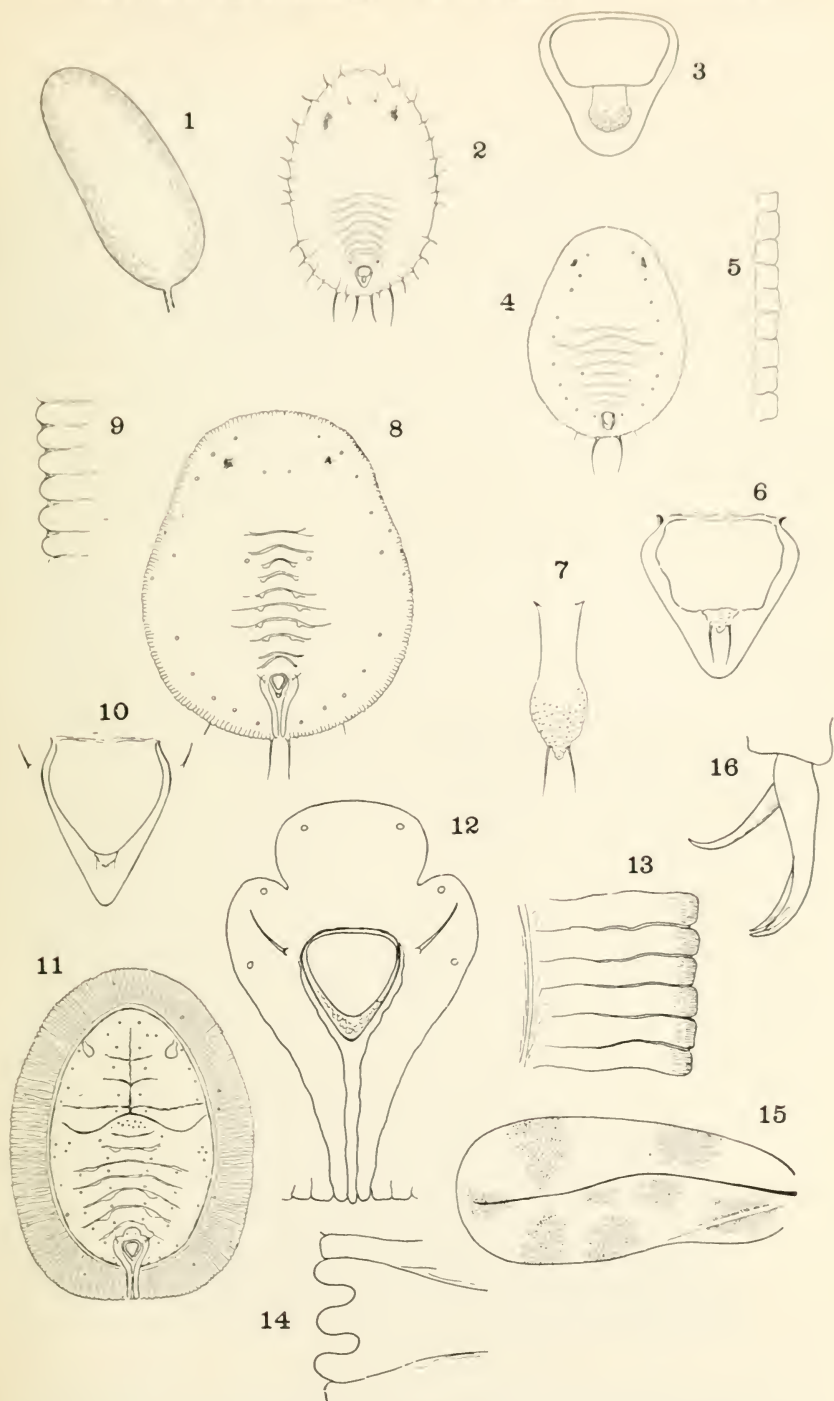
ALEUROTITHIUS TIMBERLAKEI.

Fig. 1.—Pupa case, dorsal view. Fig. 2.—Margin of pupa case. Fig. 3.—Dorsal papilla of pupa case. Fig. 4.—Papillae of submarginal area of pupa case. Fig. 5.—Vasiiform orifice. Fig. 6.—Appearance of dorsal papillae seen in dorsal aspect. Fig. 7.—Forewing. Fig. 8.—Margin of forewing. Fig. 9.—Distal segment of tarsus in claw of adult. Fig. 10.—Vasiiform orifice of adult. Fig. 11.—Genitalia of male, dorsal view. Fig. 12.—Genitalia of male, lateral view. Fig. 13.—Ovipositor of female, showing ovipositor folded. Fig. 14.—Ovipositor of female with ovipositor extended. Fig. 15.—Mentum of adult. Fig. 16.—Antenna of adult. (Original.)



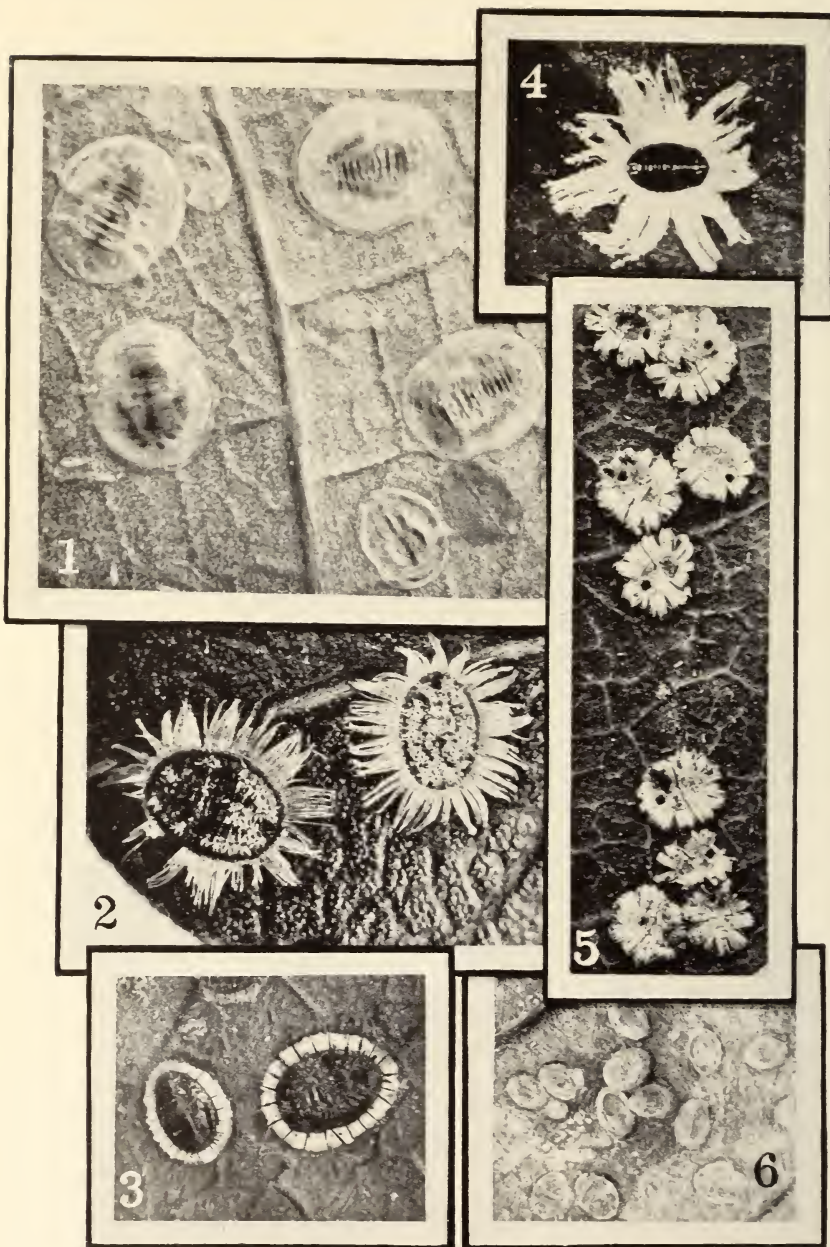
TETRALEURODES MORI.

Fig. 1.—Forewing of female. Fig. 2.—Forewing of male. Fig. 3.—Antenna of adult female. Fig. 4.—Genitalia of male. Fig. 5.—Distal end of valves of male genitalia. Fig. 6.—Adult claw. Fig. 7.—Tarsi of adult. Fig. 8.—Egg. Fig. 9.—Polygonal markings of egg surface. Fig. 10.—Larva, first instar. Fig. 11.—Larva, second instar. Fig. 12.—Margin of case of larva, second instar. Fig. 13.—Pupa case, dorsal view. Fig. 14.—Margin of pupa case. Fig. 15.—Vasi-form orifice of pupa case. Fig. 16.—Vasi-form orifice of adult. Fig. 17.—Lateral view, vasi-form orifice of adult. (Original.)



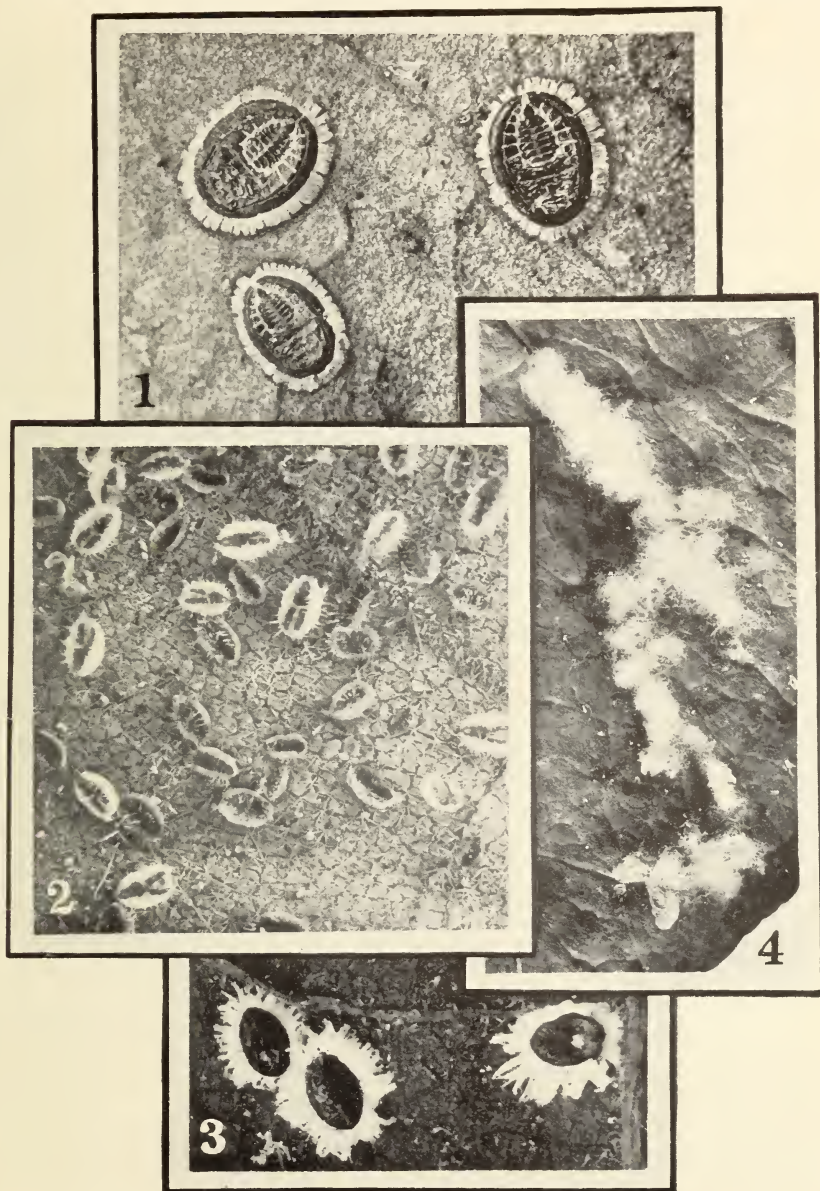
ALEUROLOBUS MARLATTI.

Fig. 1.—Egg. Fig. 2.—Larva, first instar. Fig. 3.—Vasiiform orifice of larva, first instar. Fig. 4.—Larva, second instar. Fig. 5.—Margin of case of larva, second instar. Fig. 6.—Vasiiform orifice of larva, second instar. Fig. 7.—Lingula of larva, second instar. Fig. 8.—Larva, third instar. Fig. 9.—Margin of case of larva, third instar. Fig. 10.—Vasiiform orifice of larva, third instar. Fig. 11.—Pupa case, dorsal view. Fig. 12.—Vasiiform orifice and surrounding trilobed area of pupa case. Fig. 13.—Margin of pupa case. Fig. 14.—Thoracic tracheal comb of teeth of pupa case. Fig. 15.—Forewing. Fig. 16.—Male genitalia, lateral view. (Original.)



PUPA CASES OF ALEYRODINÆ.

Fig. 1.—*Dialeurodes citri*, pupa case on leaf. Fig. 2.—*Aleuroparadoxus iridescens*, pupa case on leaf. Fig. 3.—*Alcurocanthus spiniferus*, pupa case on leaf. Fig. 4.—*Alcurotrachdus trachifer*, pupa case on leaf. Fig. 5.—*Pcalius kelloggi*, pupa case on leaf. Fig. 6.—*Aleyrodes spirzoides*, pupa case on leaf. (Original.)



PUPA CASES OF ALEYRODINÆ.

Fig. 1.—*Alcurolobus mariatti*, pupa case on leaf. Fig. 2.—*Asterochiton abutilonca*, pupa case on leaf.
Fig. 3.—*Tetraturodes mori*, pupa case on leaf. Fig. 4.—*Alcurothirus howardi*, pupa case on
leaf. (Original.)



ALEUROTITHIUS TIMBERLAKEI.

Aleurotithius timberlakei showing infestation of underside of leaves of *Eriodictyon tomentosum*.
(Original.)

Adult female.—Length from vertex to tip of ovipositor with this organ folded 1.392 mm.; color brownish yellow, dusky on appendages; eyes and tip of labium dark brown. Forewing (Pl. XLIII, fig. 8) 1.52 by 0.64 mm., slightly shaded with dusky; radial sector in about the middle of the wing; margin (Pl. XLIII, fig. 9) armed with rounded teeth which appear to be devoid of hairs. Legs long, hind tibia 0.608 mm., hind tarsus, proximal segment 0.26 mm., distal segment 0.112 mm. Labium (Pl. XLIII, fig. 11) extremely long, particularly the distal segment, which is 0.384 mm., while the second segment is 0.08 mm. Ovipositor (Pl. XLIII, figs. 13, 14) extremely long and acute, usually carried folded (Pl. XLIII, fig. 13), in which position it measures 0.32 mm.; when extended, 0.608 mm. Antennal segments (Pl. XLIII, fig. 16) with the following proportional lengths: II, 0.067 mm.; III, 0.17 mm.; IV, 0.067 mm.; V, 0.075 mm.; VI, 0.0625 mm.; VII, 0.05 mm.; distal segments subcylindric, imbricated; III with a distal fringed sensorium and a stout spine; V and VII each with a circular fringed sensorium.

Adult male.—Similar to the female in general characters and color. Length 1.04 mm.; forewing 1.2 by 0.48 mm.; hind tibia 0.56 mm.; hind tarsus, proximal segment 0.192 mm., distal segment 0.096 mm.; labium with the distal segment 0.384 mm., and the second 0.08 mm. Claspers (Pl. XLIII, figs. 10, 15) somewhat straight, 0.208 mm. long, each clasper with a median longitudinal angle which is armed with a row of six or seven stout spines.

Type.—No. 1479, U. S. National Museum. Described from males and females in balsam mounts and pupa cases in balsam mounts and dry upon foliage. Quaintance No. 8830.

This species shows a remarkable adaptation to its host plant. The leaves of this plant, *Eriodictyon tomentosum*, are very hairy, so much so that aleyrodids with mouthparts of usual length could not feed upon them. In this species the mentum and setæ are much elongated, enabling the species to reach through the hairy covering and puncture the leaf tissue for food. Similarly the ovipositor is greatly elongated to enable the female to place its eggs directly on the leaf epidermis—the universal habit among species of this family.

Genus **TETRALEURODES** (Cockerell) n. gen.

(Pl. XLIV, figs. 1-17; Pl. XLVII, fig. 3.)

Pupa case variable in size, elliptic to broadly oval in outline, usually dense black in color; margin of case with distinct teeth, the wax tubes usually well developed; submarginal area separated from dorsal disk and conspicuously fluted by suture-like lines; dorsum without papillæ, though minute pores may be present; reniform "eye spots" often evident on cephalic portion of case; tracheal folds, as a rule, not discernible; wax secretion usually a more or less copious

fringe from marginal wax tubes. Vasiform orifice small, subcordate, sometimes rounded; operculum similar in shape and almost entirely filling the orifice, obscuring the lingua; orifice usually elevated on a tubercle-like projection of the dorsum.

Adult with one flexure in radial sector of forewing and no trace of media. Antennæ of seven segments, of which the third is the longest. Sexes about equal in size.

Type, *perileuca* Cockerell; example, *mori* Quaintance.

SPECIES OF THE GENUS TETRALEURODES (Ckll).

- T. abnormis* (Quaintance), Tech. Ser. 8, Div. Ent., U. S. Dept. Agr., p. 17 (1900). (Florida.)
- T. acaciæ* (Quaintance), Tech. Ser. 8, Div. Ent., U. S. Dept. Agr., p. 19 (1900). (California; Mexico.)
- T. asparagi* (Lewis), Journ. Quekett Microsc. Club (2), vol. 6, p. 88 (1895). (Natal.)
- T. aucubæ* (Kuwana), Pomona Journ. Ent., vol. 3, no. 4, p. 625 (1911). (Japan.)
- T. corni* (Haldeman), Amer. Journ. Sci. & Arts, vol. 9, p. 109 (1850). (Pennsylvania.)
- T. dorseyi* (Kirkaldy), Bul. 2, Div. Ent. Bd. Comm. Agr. & Forestry, Hawaii, p. 52 (1907). (California.)
- Syn.: *quaintancei* Bemis.
- T. errans* (Bemis), Proc. U. S. Nat. Mus., vol. 27, p. 500 (1904). (California.)
- T. marginata* (Newstead), Mitteil. aus dem zool. Mus. in Berlin, vol. 5, pt. 2, p. 172 (1911). (East Africa.)
- T. melanops* (Cockerell), Bul. 67, Fla. Agr. Exp. Sta., p. 665 (1903). (California.)
- T. mori* (Quaintance), Canad. Ent., vol. 31, p. 1 (1899). (Eastern United States.)
- T. mori maculata* (Morrill), Psyche, vol. 10, p. 81 (1903). (Massachusetts.)
- T. mori arizonensis* (Cockerell), Science Gossip, n. s., vol. 6, p. 366 (1900). (Arizona.)
- T. nigrans* (Bemis), Proc. U. S. Nat. Mus., vol. 27, p. 522 (1904). (California.)
- T. perileuca* (Cockerell), Bul. 67, Fla. Agr. Exp. Sta., p. 664 (1903). (California; Texas.)
- T. plumosa* (Quaintance), Tech. Ser. 8, Div. Ent., U. S. Dept. Agr., p. 33 (1900).
- T. splendens* (Bemis), Proc. U. S. Nat. Mus., vol. 27, p. 489 (1904). (California.)
- T. stanfordi* (Bemis), Proc. U. S. Nat. Mus., vol. 27, p. 508 (1904). (California.)
- T. stellata* (Maskell), Trans. New Zealand Inst., vol. 28, p. 442 (1895). (Australia.)
- T. stypheliæ* (Maskell), Trans. New Zealand Inst., vol. 28, p. 442 (1895). (Australia.)
- T. ursorum* (Cockerell), Canad. Ent., vol. 42, p. 171 (1910). (Colorado.)

Genus ALEUROLOBUS n. gen.

(Pl. XLV, figs. 1-16; Pl. XLVII, fig. 1.)

Pupa case of medium size, subelliptic to oval in outline; color usually dark brown to blackish; margin toothed, the wax tubes only moderately developed; submarginal area separated from dorsal disk and much fluted by suture-like lines; dorsum without papillæ, though minute pores may be present; tracheal folds evident in some species, though obscure or wanting in others; when present terminating on margin of case in a few specialized teeth; reniform "eye spots"

usually present on cephalic portion of case; wax secretion usually present as a narrow fringe from marginal wax tubes, and sometimes on dorsum. Vasiiform orifice subcordate; operculum similar in shape, almost filling the orifice, obscuring the lingula; orifice surrounded by a definite trilobed figure, the lobes of which form a channel from the orifice caudad to margin of case.

Adult with a single flexure in radial sector of forewing and no spur of media; wings usually marked with reddish. Antennæ of seven segments; in the female, III longest; in the male, VII often as long or longer than other segments together.

Type, *marlatti* Quaintance.

SPECIES OF THE GENUS ALEUROLOBUS.

- A. barodensis* (Maskell), Trans. New Zealand Inst., vol. 28, p. 242 (1895). (India.)
- A. longicornis* (Zehntner), Arch. Java Suikerind., vol. 5, p. 381 (1897). (Java.)
- A. marlatti* (Quaintance), Canad. Ent., vol. 34, p. 61 (1902). (Japan.)
- A. niger* (Maskell), Trans. New Zealand Inst., vol. 28, p. 437 (1895). (Australia.)
- A. simula* (Peal), Journ. Asiat. Soc. Bengal, vol. 72, p. 81 (1903). (India.)
- A. taonabæ* (Kuwana), Pomona Journ. Ent., vol. 3, no. 4, p. 623 (1911). (Japan.)

UNPLACED SPECIES OF THE OLD GENUS ALEYRODES.

The writers have not been able satisfactorily to place the following species of the old genus *Aleyrodes* in any of the foregoing genera on account of inadequate descriptions. It is hoped that those familiar with these species will indicate their proper systematic position.

- A. atriplex* Froggatt, Agr. Gazette New South Wales, vol. 22, p. 757 (1911). (New South Wales.)
- A. avellanæ* Signoret, Ann. Soc. Ent. France (4), vol. 8, p. 385 (1867). (France.)
- A. carpini* Koch, Die Pflanzenläuse Aphiden, p. 327 (1857). (Europe.)
- A. complanatum* (Bärensprung) D'Alton & Burmeister, Zeit. f. Zool., vol. 1, p. 169 (1849); Spec. Bul. 88, Mass. Agr. Exp. Sta., p. 330 (1903). (Germany.)
- A. euphorbiæ* Loew, Verhandl. zool.-bot. Ges. Wien, vol. 17, p. 746 (1867). (Austria.)
- A. filicicola* Newstead, Mitteil. aus dem zool. Mus. in Berlin, vol. 5, pt. 2, p. 174 (1911). (East Africa.)
- A. fraxini* Signoret, Ann. Soc. Ent. France (4), vol. 8, p. 386 (1867). (France.)
- A. gossypii* Fitch, Third Rep. Nox. and other Ins. N. Y., p. 332 (1857). (Ningpo, China.)
- A. goyabæ* Goeldi, Mittheil. schweiz. ent. Ges., vol. 7, p. 248 (1886). (Rio de Janeiro, Brazil.)
- A. jelinekii* Frauenfeld, Verh. zool.-bot. Ges. Wien, p. 799 (1867). (France; Austria.)
- A. tabaci* Gennadius, Agricolt. Ellenica (Gennaio) (1889); also Targioni-Tozzetti, Animali ed. Ensetti del Tabacco, p. 246 (1892). (Greece.)
- A. tinæoides* Blanchard, Hist. Fisica y Polit. de Chile, Zoologia, vol. 7, p. 320 (1840). (Chile.)
- A. vaccinii* Kunow, Ent. Nachr., vol. 6, p. 48 (1880). (Germany.)
- A. zimmermanni* Newstead, Mitteil. aus dem zool. Mus. in Berlin, vol. 5, pt. 2, p. 173.

ADDITIONAL COPIES
OF THIS PUBLICATION MAY BE PROCURED FROM
THE SUPERINTENDENT OF DOCUMENTS
GOVERNMENT PRINTING OFFICE
WASHINGTON, D. C.
AT
15 CENTS PER COPY



UNIVERSITY OF FLORIDA



3 1262 09216 4887